

Amendments to the Drawings

The attached sheet of drawings includes changes to Fig. 3. This sheet, which includes Figs. 3-5, replaces the original sheet including Figs. 3-5. In Fig. 3, previously omitted elements have been added as follows:

In Fig. 3, the width "b" showing the full width of the profile that is to be produced at a respective place by a respective broach cutting tooth 21a to 21f is inserted. This width b is described in the original specification, page 11, lines 2/3.

Applicant submits that pitch "a" is shown in original Fig. 3 on the left of reference numeral "21b". The pitch "a" depicts the increase of height of successive cutting teeth. This pitch is exaggerated in Fig. 3 as successive cutting teeth differ in height in a range between 10 to 80 μm for instance (compare original specification, page 10, lines 20/21).

Further, reference numerals 28a to 28f depicting the left flank of the profile shown in Fig. 3 have been changed to 27a to 27f. This follows directly from the original disclosure, page 10, lines 21 to 26. Here, the edges 27a to 27f are introduced and it is mentioned thereafter with respect to the edges 28a to 28f that these are the opposite edges on the right in figure 3. As a consequence, the edges 27a to 27f are depicted on the left in Fig. 3.

Attachment: Replacement Drawing Sheet
 Annotated Sheet Showing Changes

REMARKS

The Official Action of January 31, 2005, and the prior art cited and relied upon therein have been carefully studied. The claims in the application are claims 1-6, and these claims define patentable subject matter warranting their allowance. Favorable reconsideration and such allowance are respectfully urged.

Claims 1-6 remain in the application for consideration.

In response to the Examiner's objection to the drawings, Applicant has enclosed an amended drawing sheet including Figs. 3-5. In Fig. 3, the width "b" showing the full width of the profile that is to be produced at a respective place by a respective broach cutting tooth 21a to 21f is inserted. This width b is described in the original specification, page 11, lines 2/3.

Applicant submits that pitch "a" is shown in original Fig. 3 on the left of reference numeral "21b". The pitch "a" depicts the increase of height of successive cutting teeth. This pitch is exaggerated in Fig. 3 as successive cutting teeth differ in height in a range between 10 to 80 μm

for instance (see original specification, page 10, lines 20/21).

Further, reference numerals 28a to 28f depicting the left flank of the profile shown in Fig. 3 have been changed to 27a to 27f. This follows directly from the original disclosure, page 10, lines 21 to 26. Here, the edges 27a to 27f are introduced and it is mentioned thereafter with respect to the edges 28a to 28f that these are the opposite edges on the right in figure 3. As a consequence, the edges 27a to 27f are depicted on the left in Fig. 3.

Applicant respectfully submits that the Examiner's objection to the drawings has now been overcome.

Applicant has amended claim 1 to include a more precise wording of the non-cutting ability of the guide edges 27a to 27f and the relieved edges 28a to 28f. This non-cutting ability, i.e. the forming of the allocated flank in the vicinity of the pitch a , is described in the original specification, page 11, lines 7 to 13.

Applicant has further amended claims 3-6 to include a definition of the arrangement of the cutting teeth on the basis of the arrangement of the chip spaces. Applicant respectfully submits that this amendment overcomes the 35 USC

§112, first paragraph rejection of claims 3-6 presented by the Examiner on pages 3 and 4 of the Office Action.

The Examiner has further rejected claims 1 and 2 under 35 U.S.C. §103(a) as being unpatentable over Psenka '919 in view of Applicant's Admitted Prior Art (AAPA) and Gotberg '385. Applicant respectfully traverses this rejection as applied to the claims as amended.

Psenka teaches an internal broach 10 for internally broaching tooth space profiles 30 having a bottom and flanks. Tooth sections 20 to 23 with several rows of broach cutting teeth A to G, 60 to 65, are present. These teeth have bottom cutting blades and first and second sides. The bottom cutting blades of series of successive broach cutting teeth A to D; E to G; 60 to 65, respectively, have a pitch relative to the respective leading broach cutting tooth. A first series A to D of Psenka's broach cutting teeth has cutting edges 41, 43; 44, 46; 47, 49; 50, 52 on both sides and at the bottom. A second series E to G of broach cutting teeth has a guiding edge 52 on the right hand side and bottom cutting edges and cutting edges 54 on the left hand side. A third series 60 to 65 of broach cutting teeth has guiding/cutting sides and cutting bottom edges 60 to 65. The sides of the broach cutting teeth series E to G and 60 to 65 are not backed off (see column 4, lines 10

to 15 of Psenka). Whether the other cutting edges of Psenka's teeth series are relieved/backed off is not disclosed in any detail.

Psenka teaches broach cutting teeth E to G having sides with a guiding function, but Applicant notes that these teeth have no bottom cutting blades. Instead, radially stepped cutting portions (see 75 in figure 5) are present at the bottom tooth section. Further, opposite to the guiding side 72, the teeth of this series E to G have cutting edges 54 following the profile to be broached. Thus, the teeth of the series E to G do not teach the broach cutting teeth as stipulated in amended claim 1 having a bottom cutting blade, a guiding side and a non-cutting relieved edge on the opposite side, as can be seen from an analysis of the mode of operation of the claimed invention:

The cutting action of the teeth stipulated in amended claim 1 only takes place at the bottom cutting blades. Both sides of the teeth do not serve cutting functions. Only side portions of the teeth in the vicinity of pitch "a" serve forming functions but do not cut as is explained on page 11, second para of the original specification. That part of the guide edges below the pitch following the profile of the preceding tooth has no cutting but only guiding function. That

part of the second sides of the teeth opposing the guiding edges and below the vicinity of the pitch does not come into contact with the profile flanks at all and therefore neither has a cutting nor a guiding function.

As outlined above, teeth series E to G of Psenka do not teach the teeth stipulated in amended claim 1. Teeth series A to D fails to show a guiding flank and therefore the description of this teeth series is not helpful regarding the subject of amended claim 1. Teeth series 60 to 65 of Psenka consists of teeth having a profile which as a whole is complementary to the profile to be broached. Therefore, no side of teeth series 60 to 65 is a non-cutting relieved edge comparable to the relieved edges 28a to 28f of the present invention. Thus, Applicant submits the subject of amended claim 1 is patentable over Psenka.

From applicant's admitted prior art (AAPA) the expert is taught to use broach cutting teeth having a bottom-cutting-blade relief surface. There is no teaching of teeth having a guiding flank on one side and a flank which aside a forming portion in the vicinity of a pitch does not come into contact with the profile to be broached. Therefore, Applicant submits that the subject of amended claim 1 is patentable over Psenka in view of AAPA.

Gotberg '385 teaches a broach for finishing hardened internal involuted toothed (preformed) forms. Gotberg's broach serves a very special function which would lead the expert away from combining the features of Gotberg's broach cutting teeth with those of e.g. Psenka. Even if the expert tentatively tried such a combination, it would not lead to the subject of amended claim 1. Gotberg's broach cutting teeth have partially relieved flanks 18. Each tooth cuts over the whole relieved side portion overlapping with the preformed hardened profile to be broached. Both sides of Gotberg's teeth also serve guiding functions (see portions 19, 20 of Gotberg's teeth in figure 3). Therefore, Gotberg also fails to show broach cutting teeth having a guiding flank on one side and an opposing flank being - aside of the forming portion in the vicinity of the pitch - totally free from, i.e. not into contact with, the workpiece. Thus, Applicant submits that the subject of amended claim 1 is patentable over Psenka in view of Gotberg.

As none of the documents cited by the examiner shows teeth with a guiding flank on one side and a forming/free flank on the opposing side, Applicant respectfully submits that the subject of amended claim 1 is patentable over Psenka in view of AAPA, and further in view of Gotberg.

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Amdt. dated June 30, 2005
Reply to Office Action of January 31, 2005


Acknowledgement by the PTO of the receipt of applicants' papers filed under Section 119 is noted.

The prior art documents made of record and not relied upon have been noted along with the implication that such documents are deemed by the PTO to be insufficiently pertinent to warrant their applications against any of applicant's claims.

Favorable reconsideration and allowance are earnestly solicited.

Respectfully submitted,

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